R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE CLAIMS

Independent claim 1 has been amended to incorporate subject matter based on claims 15-18. Claims 15 and 16 have been canceled. Claims 17-19 have been amended to depend from and better accord with amended independent claim 1. And claims 14, 20 and 21 have been amended to better accord with amended independent claim 1.

Independent claim 39 has been amended to incorporate subject matter based on claims 40, 41, 43 and 44. Claims 40 and 41 have been canceled, and claims 43 and 44 have been amended to depend from and better accord with amended independent claim 39.

Claims 1 and 39 have also been amended to make some additional clarifying amendments.

Still further, claims 1, 21 and 39 have been amended to correct the informalities pointed out by the Examiner on page 5 of the Office Action. Accordingly, t is respectfully requested that the objection to claim 21 and the rejections of claims 1 and 39 under 35 USC 112, second paragraph, be withdrawn.

No new matter has been added, and it is respectfully requested that the amendments be approved and entered.

THE PRIOR ART REJECTION

Claims 1-28 and 39-44 were rejected under 35 USC 103 as being obvious in view of the combination of US 2001/0030324 ("Morikawa et al") and USP 5,828,773 ("Setlak et al"); claims 29-37 were rejected under 35 USC 103 as being obvious in view of the combination of Morikawa et al, Setlak et al, and US 2002/0014530 ("Iihama"); and claim 38 was rejected under 35 USC 103 as being obvious in view of combination of Morikawa et al, Setlak et al, Iihama, and USP 6,240,199 ("Manchanda et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

Amended independent claim 1 recites an image reading apparatus comprising: a detecting surface adapted to have a detecting object placed thereon; a sensor array comprising a plurality of sensors arranged to read an image pattern of the detecting object placed on the detecting surface; and a contact detector which detects whether the detecting object has been brought into contact with the detecting surface and determines whether the detecting object that has been brought into contact with the detecting surface is a predetermined specific detecting object.

According to amended independent claim 1, the contact detector comprises: a first detection electrode, which is provided at least on an upper portion of the sensor array, and

which comprises the detecting surface; a second detection electrode which comprises a conductive case member that is formed of a conductive material and surrounds the sensor array, the second detection electrode being electrically insulated and spaced apart from the first detection electrode; a counter electrode which is provided at a lower side of the first detection electrode that is on an opposite side of the first detection electrode from the detecting surface, the counter electrode being opposite to the lower side of the first detection electrode with an interlayer insulating film provided therebetween; a signal voltage applying circuit which applies a signal voltage having a first signal waveform that varies periodically to the counter electrode to excite a second signal waveform to the first detection electrode through the interlayer insulating film; and a detecting circuit connected to the second detection electrode.

Still further, according to amended independent claim 1, the detecting circuit (i) detects, upon contact of the detecting object with both the first detection electrode and the second detection electrode, a third signal waveform excited to the second detection electrode, (ii) compares the third signal waveform with a threshold voltage that is preset based on a capacitance component and a resistance component of the specific detecting object, and (iii) detects whether the detecting object

has been brought into contact with the detecting surface and determines whether the detecting object is the specific detecting object when the threshold voltage is included within a range of a voltage amplitude of the third signal waveform.

Yet still further, according to amended independent claim 1, the threshold voltage is set either to a voltage that is higher than an upper limit value of the third signal waveform excited to the second detection electrode in a state in which the detecting object does not come into contact with the detecting surface, or to a voltage that is lower than a lower limit value of the third signal waveform excited to the second detection electrode in a state in which the detecting object does not come into contact with the detecting surface.

Morikawa et al describes features for detecting finger contact that are provided immediately above a sensor array - i.e., an electrostatic electricity discharging and contact sensing electrode 31 formed on an array region and contact detectors 150 and 170 connected to the electrostatic electricity discharging and contact sensing electrode 31. The electrostatic electricity discharging and contact sensing electrode 31 (electrodes 31a and 31b) of Morikawa et al is provided directly above the sensor region, but it does not surround the sensor region. Since the electrostatic electricity discharging and contact sensing electrode 31 forms a detecting surface on which a

detecting object is placed, it differs from the second detection electrode recited in claim 1, which "comprises a conductive case member that is formed of a conductive material and surrounds the sensor array, the second detection electrode being electrically insulated and spaced apart from the first detection electrode [which comprises the detecting surface]."

The contact detector 150 of Morikawa et al comprises a signal generator to apply a signal waveform to a transparent conductive film 31 and detects a signal generated by the transparent conductive film 31. Finger contact is detected by detecting a delay of the generated signal against the applied signal arising from a change in impedance due to the finger contact.

By contrast, according to the present invention as recited in amended independent claim 1, the detecting circuit detects a third signal waveform excited to a second detection electrode, detects contact of a detecting object based on the detected third signal waveform, and determines whether the detecting object is a predetermined specific detecting object. However, this series of steps is performed based on whether a preset threshold voltage is included within a range of a voltage amplitude of the third signal waveform. This threshold voltage is set either to a voltage that is higher than an upper limit value of the third signal waveform excited to the second detection electrode in a

state in which the detecting object does not come into contact with the detecting surface, or to a voltage that is lower than a lower limit value of the third signal waveform excited to the second detection electrode in a state in which the detecting object does not come into contact with the detecting surface.

More specifically, according to claim 1, a signal is not applied directly to the second detection electrode. When the detecting object is not in contact with the second detection electrode, a signal detected by the detecting circuit, which is connected to the second detection electrode, has been excited by the second signal waveform excited to the first detection electrode, and the first detection electrode is spaced apart from the second detection electrode. The amplitude waveform of the signal detected by the detecting circuit when the detecting object is not in contact is smaller than that of the signal detected by the second detection electrode when the detecting object is in contact. When the detecting object is in contact, the capacitance component increases between the first detection electrode and the second detection electrode, and in turn the amplitude of the third signal waveform detected by the detecting circuit increases. By comparing the third signal waveform with the preset threshold voltage, whether the detecting object has been brought into contact is detected, and whether the detecting object is the specific detecting object is determined.

Morikawa et al discloses detecting finger contact, by applying a signal waveform to a detection electrode, based on a signal waveform change in response to a decrease in the impedance upon the finger contact. And it is respectfully pointed out that even when detecting a change in the signal level from the state where the finger is in not contact to the state where the finger is in contact, the change to be detected is a decrease in the voltage level caused by a decrease in the impedance. And it is respectfully submitted that the invention described in Morikawa et al would not have suggested the features recited in amended independent claim 1 whereby: (i) the threshold voltage is set either to a voltage that is higher than an upper limit value of the third signal waveform excited to the second detection electrode in a state in which the detecting object does not come into contact with the detecting surface, or to a voltage that is lower than a lower limit value of the third signal waveform excited to the second detection electrode in a state in which the detecting object does not come into contact with the detecting surface, and (ii) it is detected whether the detecting object has been brought into contact with the detecting surface and determined whether the detecting object is the specific detecting object when the threshold voltage is included within a range of a voltage amplitude of the third signal waveform.

Setlak et al discloses a fingerprint sensor 30 comprising a substrate 65; a ground plane electrode layer 68; a drive electrode layer 71 provided on the ground plane electrode layer 68 with a dielectric layer 70 provided therebetween; an insulating layer 76 provided on the drive electrode layer 71; a plurality of sensor units 30a on an upper surface of the insulating layer 76 arranged in array pattern, the plurality of sensor units 30a having a sensing electrode 78 and an annularly shaped shield electrode 80 surrounding the sensing electrode 78; a dielectric layer 52 provided on the insulating layer 76, the dielectric layer 52 to be contacted by a finger 79; an electrode 54 provided around a periphery of the dielectric layer 52, the electrode 54 to be contacted by the finger 79; a package 51; an excitation drive amplifier 74 applying an alternating current to the drive electrode layer 71; and an amplifier circuit 73 connected to the sensing electrode 78, the amplifier circuit 73 amplifying a signal sent to the sensing electrode 78, wherein the finger 79 comes into contact with the dielectric layer 52 and the electrode 54; and wherein the electrode 54 is connected to the ground plane electrode layer 68 and is set to ground potential.

In the structure of Setlak et al, by applying a signal ranging between 1 KHz and 1 MHz from the excitation drive amplifier 74 to the drive electrode layer 71, the amplifier circuit 73 is used to detect a change in the signal sent to the

detection electrode 78 upon contact of the finger 79 with the dielectric layer 52 so as to read the fingerprint. Setlak et al discloses that the electrode 54 is provided on the package 51 and that the finger 79 comes into contact when reading the fingerprint. In the structure of Setlak et al, however, the electrode 54 is set to ground potential. The electrode 54 is provided to set the finger 79 to ground potential to reading the fingerprint, but not to detect finger contact. Thus, the electrode 54 of Setlak et al differs from the second detection electrode of the present invention.

Accordingly, it is respectfully submitted that even if Morikawa et al and Setlak et al were combinable as suggested by the Examiner, the structure of the present invention as recited in amended independent claim 1 still would not be achieved or rendered obvious.

It is respectfully submitted, moreover, that amended independent method claim 39 similarly patentably distinguishes over Morikawa et al and Setlak et al.

Still further, it is respectfully submitted that Iihama and Manchanda et al also do not disclose or suggest the structure and method of the present invention as recited in amended independent claims 1 and 39.

Accordingly, in view of the foregoing, it is respectfully submitted that the present invention as recited in amended

independent claims 1 and 39 and all of the claims respectively depending therefrom clearly patentably distinguish over Morkiawa, Setlak et al, Iihama, and Manchanda et al, in any combination under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

/Douglas Holtz/

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